

SECOND MODIFICATION OF APPENDIX 2

SCOPE OF WORK FOR THE REMEDIAL DESIGN
AND REMEDIAL ACTION WORK PLAN
AT
WEST KL AVENUE LANDFILL, KALAMAZOO, MICHIGAN

I. PURPOSE

The purpose of this Remedial Action at the West KL Avenue Landfill (the Facility) is to implement the Record of Decision for this Facility which was signed by the Regional Administrator on September 28, 1990, as amended by the Record of Decision Amendments, which were signed by the Director, Superfund Division on February 27, 2003 and September 12, 2005. U.S. EPA Superfund Remedial Design and Remedial Action Guidance, the Final Record of Decision, all Record of Decision Amendments, the approved Remedial Design/Remedial Action (RD/RA) Work Plan, any additional guidance provided by U.S. EPA, and this Scope of Work (SOW) shall be followed in designing and implementing this Remedial Action at the Facility as well as the provisions as stated within the Consent Decree entered by the Court on November 17, 1992 in United States v. The Upjohn Co., et al., Civil Action No. 1:92cv659 (W.D. Mich.) (the "Consent Decree"), the First Amendment to the Consent Decree entered by the Court on April 15, 2005 (the "First Amendment") and the Second Amendment to the Consent Decree (the "Second Amendment").

II. DESCRIPTION OF THE REMEDIAL ACTION

A. Performance Standards:

The performance standards and specifications of the major components of the remedial action for the Facility that shall be designed and implemented by the Performing Settling Defendants are:

1. Fence Installation:

Performing Settling Defendants shall install a fence around the landfill and other areas containing equipment for remedial action activities and maintain the fence in good repair. The fence will aid in protecting the integrity of the landfill cap and the groundwater treatment structures, if necessary, and will restrict access to the landfill by trespassers. The fence shall consist of a six-foot high chain link perimeter fence topped with three-strand barbed wire. The length of the fence will be determined after the design of the landfill cap and the placement of the groundwater treatment facility, if necessary. Warning signs shall be posted at 200-foot intervals along the

fence and at the gate, or one sign per side if the sides are less than 200 feet in length. The warning signs shall include the following language: "Warning: Closed Landfill, No Trespassing, Please Call (contact telephone number to be determined) at Oshtemo Township for More Information." The Performing Settling Defendants shall post warning signs at each open landfill gas vent warning of the landfill gas hazard as long as the vent exist and are open. The Performing Settling Defendants shall also install a clearly visible permanent marker at each gated entrance to the site. The permanent markers shall contain language, approved by U.S. EPA, that clearly describes the specific use restrictions, institutional controls, and/or notices at the site, and provide a local contact for more information.

2. Institutional Controls:

a. Landfill Institutional Controls.

Performing Settling Defendants shall cause to be implemented institutional controls, in accordance with Section V, paragraph (9) of the Consent Decree, to prohibit future development of the Landfill (including, but not limited to, on-site excavations, construction and drilling) and to prohibit the installation of groundwater drinking water supplies at the Facility. The deed restrictions regarding future development of the Landfill shall be considered permanent, unless otherwise approved by U.S. EPA. The restrictions regarding the future installations of groundwater drinking water wells may be lifted if the contaminant levels within the groundwater at the Facility and within the zone noted above, fall below, and remain below, the cleanup standards, as determined by the U.S. EPA.

b. Record of Decision Amendment Groundwater Institutional Controls.

The Performing Settling Defendants shall use best efforts to implement, or cause to be implemented, institutional controls through appropriate local governmental action prohibiting installation and use of private drinking water wells within the municipal water supply zone created by the February 27, 2003, ROD Amendment, and amended by the September 12, 2005 ROD Second Amendment, and generally depicted in Figure 1 to this Second Modification of Appendix 2. The Performing Settling Defendants shall submit a draft Application for Groundwater Use Restrictions to U.S. EPA and MDEQ within forty-five (45) days after lodging of the Second Consent Decree Amendment. If Performing Settling Defendants are unable to obtain such institutional controls through local governmental action within six months from the date of lodging, or within six months of U.S. EPA or MDEQ approval of the governmental required Application, whichever is greater, then Performing Settling Defendants shall promptly notify the United States. The United States thereafter may direct, in its discretion, the Performing Settling Defendants to use best efforts to obtain deed

restrictions prohibiting installation and use of private drinking water wells within the municipal water supply zone. If such deed restrictions are not obtained despite best efforts within four months, the Performing Settling Defendants shall promptly notify the United States. The United States thereafter may assist the Performing Settling Defendants in obtaining deed restrictions, to the extent necessary to effectuate the remedial action for the Facility, using such means as it deems appropriate. The United States' costs in this effort, including attorneys' fees and other expenses and any compensation that the United States may be required to pay to the property owner, shall be considered costs of response and shall be reimbursed by Performing Settling Defendants in accordance with Section XVI of the Consent Decree (Reimbursement).

In lieu of the institutional control methods specified above in this Paragraph II.A.2.b., Performing Settling Defendants may propose an alternative reasonable institutional control method and timetable for prohibiting installation and use of private drinking water wells within the municipal water supply zone. Upon approval of any such alternative institutional control method, Performing Settling Defendants shall implement the alternative institutional control method as approved by U.S. EPA, in accordance with the timetable approved by U.S. EPA. Any determination by U.S. EPA with respect to an alternative institutional control method shall constitute a determination regarding the selection or adequacy of a response action under the Consent Decree.

Institutional controls required pursuant to this paragraph II.A.2.b. may be terminated if contaminant levels within the groundwater at the Facility and within the service zone fall below, and remain below the cleanup standards, as determined by U.S. EPA. The Performing Settling Defendants shall submit any proposal to terminate the institutional controls to U.S. EPA for approval. The Performing Settling Defendants shall obtain approval from U.S. EPA prior to implementing any such change.

3. Access/Deed/Easement:

Performing Settling Defendants, in accordance with Section V, paragraph 9 of the Consent Decree, shall secure access to the Facility and all adjacent areas where Work is to be performed pursuant to the Consent Decree and this SOW and shall acquire deeds or easements, as necessary, to maintain the cap and fence on the Landfill and to install monitoring wells, the groundwater extraction wells and all the components of any necessary treatment facilities, including discharge lines, injection wells and/or infiltration ponds, on those portions of the Facility not presently owned by the Performing Settling Defendants.

4. Installation and Implementation of Groundwater Monitored Natural Attenuation Monitoring Program:

Within sixty (60) days from the lodging of the Second Amendment the Performing Settling Defendants shall submit a draft Groundwater Monitored Natural Attenuation Monitoring Work Plan (MNA Work Plan) providing specific details on the scope and performance criteria of the Groundwater Monitored Natural Attenuation Monitoring Program (MNA Monitoring Program). The MNA Monitoring Program shall be designed to accomplish the following: a) demonstrate through multiple lines of evidence that natural attenuation is occurring and that plume expansion is not occurring; b) identify any potentially toxic transformation products resulting from biodegradation; c) ensure no impact to downgradient receptors; d) detect new releases of contaminants to the environment that could impact the effectiveness of the monitored natural attenuation remedy; e) demonstrate the efficacy of institutional controls that were put in place to protect potential receptors; f) detect changes in environmental conditions that may reduce the efficiency of natural attenuation processes; and, g) verify attainment of remedial objectives.

The MNA Monitoring Program shall be designed to detect changes in contaminant characteristics and increases/decreases in the concentration of hazardous substances, pollutants and contaminants in the shallow and deep aquifer at and near the Facility. Groundwater monitoring shall include, but not be limited to, collection of field and laboratory analysis of samples from selected monitoring and residential wells identified in the MNA Work Plan and approved by the U.S. EPA, in consultation with the Michigan Department of Environmental Quality (MDEQ). The frequency of sampling and the parameters sampled at each selected monitoring well shall be detailed within the MNA Work Plan and the Operation and Maintenance Plan. The MNA Work Plan shall also specify the criteria to be used for increasing or decreasing monitoring frequency and/or parameters and contingency measures to address exceedances of cleanup standards. Monitoring wells designed for sampling will be consistent with Section II.C. of this SOW and will be determined in the MNA Work Plan and within the Operation and Maintenance Plan, consistent with the requirements of Section III, Task II of this SOW. The frequency of sampling and the parameters sampled at each selected monitoring well shall be detailed within the MNA Work Plan and the Operation and Maintenance Plan and subject to U.S. EPA review and approval, in consultation with MDEQ. The detection limit shall be identified by the Performing Settling Defendants in the MNA Work Plan and the Quality Assurance Project Plan and subject to approval by the U.S. EPA. The detection limits and analytical methods shall

be identified by the Performing Settling Defendants in the MNA Work Plan and the Quality Assurance Project Plan and subject to U.S. EPA review and approval. The detection limits shall be the more stringent of Federal detection limits, as provided in the "Contract Lab Program Statement of Work for Organic Analysis" and the "Contract Lab Program Statement of Work for Organic Analysis" for that parameter or the State detection limits for the parameter as provided in Attachment A, "RRD Operational Memorandum No. 2, Subject Sampling and Analysis Attachment 1: Target Detection Limits and Designated Analytical Methods", dated October 22, 2004, and any amendments made thereto during the course of the implementation of this Consent Decree, or as otherwise approved by U.S. EPA. Criteria regarding the calculating of the carcinogenic and noncarcinogenic risks are described in paragraphs 12.a.2 and 12.a.3 of the Consent Decree as amended by the First Amendment.

The Performing Settling Defendants shall perform monitoring of select residential wells outside or near the plume margin. Residential well monitoring shall be performed in accordance with the March 2, 2000 Residential Monitoring Plan, as amended. The list of wells to be monitored shall be updated based on monitoring results. Monitoring of select wells may be discontinued if provided with municipal water service and upon approval from U.S. EPA.

The Settling Defendants shall perform a complete evaluation of the effectiveness of the MNA remedy every five years after initiation of construction of the landfill cover. The Performing Settling Defendants shall perform an evaluation of the need for additional source control measures at the time of the second five-year review, unless site conditions may present an imminent and substantial endangerment to human health or the environment. The MNA Work Plan shall specify the procedures and analyses to be used to evaluate the effectiveness of the MNA remedy. The MNA Work Plan shall identify contingency measures that will be implemented should source control or MNA prove to be ineffective in achieving performance standards within a reasonable timeframe in comparison to an active remediation system. The MNA Work Plan shall also identify the criteria and analyses to be used in determining when contingency measures will be implemented. The MNA Work Plan shall identify any additional studies (e.g. treatability studies, pilot studies) necessary to fully implement the proposed contingency measures and shall specify a schedule for completion of the necessary additional studies.

5. Surface Water Monitoring:

Bonnie Castle Lake, Dustin Lake and the unnamed ponds immediately

adjacent to the Landfill will be sampled at locations, at a frequency and for parameters detailed in the MNA Work Plan and approved by the U.S. EPA, in consultation with the MDEQ. If an on-site infiltration pond is utilized for discharge of treated groundwater, then this pond will be sampled quarterly, for parameters detailed in the Work Plan. The detection limits shall be identified by the Performing Settling Defendants in the Work Plan and the Quality Assurance Plan and subject to approval by the U.S. EPA, in consultation with the MDEQ. The detection limits shall be the more stringent of Federal detection limits for that parameter or the State detection limit, as provided in Attachment A to the SOW ("RRD Operational Memorandum No. 2, Subject Sampling and Analysis Attachment 1: Target Detection Limits and Designated Analytical Methods", dated October 22, 2004), and any amendments made thereto during the course of the implementation of this Consent Decree, or as otherwise approved by U.S. EPA, as the detection limits may be amended. Criteria regarding the calculating of the carcinogenic and noncarcinogenic risks are described in paragraphs 12.a.2 and 12.a.3 of the Consent Decree as amended by the First Amendment. If sampling reveals contamination entering any surface water body in excess of any State or Federal regulation, i.e. Clean Water Act, appropriate action shall be taken.

6. Landfill Cover:

Performing Settling Defendants shall design and install the landfill cover to meet or exceed the requirements stated within the ROD and with the approval of U.S. EPA. Specifically, the landfill cap shall consist of a multi-layer RCRA type cap meeting the requirements of Part 111 of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (formerly known as the Michigan Hazardous Waste Management Act, or Act 64). The cap shall be designed to minimize percolation of precipitation through the waste material. The cap shall consist of the following: a) a geosynthetic clay layer; b) a 40 mil geomembrane liner; c) a geocomposite drainage layer; d) an 18-inch layer of clean fill; and e) a vegetated 6-inch layer of topsoil.

Where needed, as determined by U.S. EPA, a minimum 6 inch thick grading layer shall be designed, installed and maintained as the initial layer over the final elevation of the Landfill to attain the required slope and provide for a stable base for subsequent system components. The grading layer may not be warranted in all areas of the Facility since the Facility has been previously covered.

The cap shall have a final cover system capable of allowing removal, monitoring, and, if needed, treatment of generated landfill gases.

Seed and fertilizer shall be applied to the topsoil layer to establish a vegetation cover. The vegetation shall be a persistent species having roots that will not penetrate beyond the vegetative layer. The seed type and amount of fertilizer applied shall be proposed in the Design and Specifications Plan and will depend on the type and quality of topsoil and compatibility with both native vegetation and the final site use.

7. Landfill Gas:

Landfill gas vents shall be installed to prevent gases from migrating horizontally away from the site and from ruining the integrity of the landfill cap. Approximately 1 vent per 5 acres capped, at a minimum, will be necessary. Landfill gas from the gas vents shall be monitored for parameters and at a frequency as determined by state and federal regulations and detailed in the Work Plan. If at any time the gas monitoring indicates a confirmed release of contaminants into the air that presents a health hazard (based on U.S. EPA risk assessment guidance or the minimum requirements of State or federal regulations) outside the landfill boundaries (cumulative excess cancer risk greater than 1×10^{-6} or cumulative HI value greater than 1) Performing Settling Defendants shall propose the appropriate measures needed to further evaluate, and if appropriate, as determined by U.S. EPA, in consultation with the MDEQ, reduce or eliminate the releases. If appropriate, as determined by U.S. EPA, Performing Settling Defendants shall implement measures necessary to reduce or eliminate the releases. A confirmed release is defined by the recording of quantifiable sampling results from two consecutive sampling events taken from within the same area of the landfill. Also, if at any time the landfill gas on-site or migrating horizontally off-site presents an explosive hazard, as determined by U.S. EPA, in consultation with the MDEQ, and pursuant to 40 CFR Part 257.3-8, appropriate action will be taken. Performing Settling Defendants shall take measures as directed by U.S. EPA to eliminate explosive hazards.

8. Municipal Water Supply

The Performing Settling Defendants shall supply municipal water to all private well users within the area indicated on Figure 1, and generally bounded by KL Avenue to the south, West Main Street to the north, Skyview Drive to the west, and the landfill property boundary to the east. This task shall include abandonment of the private drinking water well at each property supplied with municipal water and connection of each private well user to the City of Kalamazoo municipal water system. This action will create a one-thousand foot buffer zone around the groundwater plume ensuring protection of the drinking water supply

while monitored natural attenuation is ongoing. This action allows for retention of the existing well if the well will be used solely for irrigation or other non-potable uses as approved by MDEQ and the County.

Within 30 days of lodging of the Second Amendment the Performing Settling Defendants shall submit, to U.S. EPA for review and approval, a draft Amendment to the July 30, 1999 "Work Plan for Municipal Water Installation, Springwood Hills Subdivision Area". The amendment shall include a description of the work to be performed, project organization, points of contact, reporting requirements, and a schedule for completion of the work.

B. Cleanup Standards:

The Work required by the Consent Decree, the First Amendment, the Second Amendment and this SOW shall be designed, installed, operated and maintained to achieve the Cleanup Standards as stated within the Consent Decree, paragraphs 12.a.2 and 12.a.3, as amended by paragraph 9 of the First Amendment.

C. Points of Compliance:

In order to monitor and evaluate the remedial actions throughout the Facility, certain groundwater monitoring wells shall be selected as sampling points as per paragraphs 12.a.2 and 12.a.3 of the Consent Decree as amended by the First Amendment. Points of Compliance with regard to groundwater shall be the landfill boundary and all points beyond, i.e. locations where the cleanup standards as per Section II.B of this SOW, must be met. The groundwater monitoring program will be detailed in the MNA Work Plan and in the Operation and Maintenance Plan. The monitoring wells to be sampled annually, semi-annually and quarterly as per Section II.A.4 of this SOW shall include but not be limited to the following wells: TW-4, MW-10, MW-13, M—8, P-46, P-48, P-49, P-50, P-51, P-52, P-53, and P-55, or alternative wells as approved by the U.S. EPA, in consultation with MDEQ. Other groundwater monitoring wells shall be added to the groundwater monitoring program after the design of the MNA monitoring program and as determined to be necessary by the U.S. EPA. If groundwater monitoring wells within the sampling program are destroyed or in any way unsampleable, unless the water table has been seasonably lowered which temporarily prevents proper sampling for that sampling period, they shall be repaired or replaced. The location of any additional wells installed pursuant to the Consent Decree, the First Amendment, the Second Amendment or this SOW shall be approved by the U.S. EPA, in consultation with the State. Points of compliance regarding air and surface water sampling will be determined in the Work Plan and the O&M Plan.

III. SCOPE

The Remedial Action to be implemented by the Performing Settling Defendants at the West KL Avenue Landfill site shall consist of five tasks. The Performing Settling Defendants shall prepare and submit to the U.S. EPA and the MDEQ an RD/RA Work Plan and RD Project Plans which shall consist of the following tasks and elements as described below and consistent with U.S. EPA guidance:

Task I: RD/RA Work Plan

- A. Pre-design Work Plan
- B. Additional Studies
- C. Sampling and Analysis Plan
- D. Quality Assurance Project Plan
- E. Plan for Satisfaction of Permitting Requirements
- F. Project Schedule

Task II: Remedial Design Project Plans

- A. Design and Specifications Plan
- B. Operation and Maintenance Plan
- C. Cost Estimate
- D. Construction Quality Assurance Objectives Plan
- E. Health and Safety Plan
- F. Design Phases
- G. Community Relations Support

Task III: Remedial Action Construction

- A. Responsibility and Authority
- B. Construction Quality Assurance Personnel Qualifications
- C. Inspection Activities
- D. Sampling Requirements
- E. Documentation

Task IV: Reports

- A. Progress Reports
- B. Draft Plans and Reports
- C. Final Plans and Reports

Task V: Schedule for RD/RA Reports and Implementation

Task I: RD/RA WORK PLAN

The Performing Settling Defendants shall prepare and submit to the U.S. EPA and the

State, in accordance with the schedule set forth in Task V, below, Pre-design Work Plan and an RD/RA Work Plan which shall document the overall management strategy for performing the RD/RA including but not limited to, identifying additional data needs necessary to initiate or complete the remedial action(s) (i.e., additional monitoring wells, geophysical work, pilot tests, etc.), and implementing the design, construction, operation, maintenance and monitoring of the Remedial Action(s), consistent with the ROD and the Consent Decree, the First Amendment and the Second Amendment. The Work Plans shall document the qualifications, responsibility and authority of all organizations and key personnel involved with the implementation of the RD/RA, including contractor personnel. In addition, a plan for satisfaction of permitting requirements shall also be part of the Work Plans. Significant modifications to the SOW/Work Plans must be accomplished through the modification procedures as set forth within the Consent Decree, the First Amendment and the Second Amendment. The Remedial Action portion of the Work Plan shall be revised to be consistent with the final terms of the approved remedial design. Minimally, the Work Plan shall include, but not be limited to, the following:

A. Pre-design Work Plan

Prior to the submittal of the RD/RA Work Plan, the Performing Settling Defendants shall prepare and submit to the U.S. EPA and the State, a Pre-design Work Plan. The Pre-design Work Plan shall include, but not necessarily be limited to, the criteria needed to conduct a pump test at the site, to define the hydraulic characteristics and the potential interconnection between the upper and lower aquifer north and northeast of the site, and work needed to further define the groundwater divide to the east of the site. The Work to be covered within the Pre-design Work Plan, at a minimum, shall include the following:

1. The installation of two sets of nested piezometers, at locations to be approved by U.S. EPA in consultation with the MDNR, and possibly a third set of nested piezometers to the north and west of the site to define hydraulic conditions which may affect fluid flow and contaminant transport from the shallow to the deep aquifer. Vertical sampling of waters shall be performed as a contaminant screening activity during these boring activities. The nested piezometers shall be completed in each location chosen so that screens are installed at the top and base of the shallow aquifer and at the top of the deep aquifer. In the event that the clay, identified as Zone V in the ROD and the Remedial Investigation Report is absent, screens shall be installed at the top and the base, no deeper than bedrock, of the aquifer.
2. The installation of two initial piezometer clusters, at locations to be approved by U.S. EPA in consultation with the MDNR, to better define hydraulic head levels to the east and the southeast of the site prior to the initiation of a pump

test. These piezometers shall be used to better determine the location of a groundwater divide in the shallow aquifer and shall be monitored to demonstrate that reinjection of purged waters or pump test effluent will not cause the flow of additional waters over the divide. Additional piezometers clusters may be required to adequately define hydrogeologic conditions in this area at a future date.

3. Installation of additional piezometers which shall be utilized to gather potentiometric data during the pump test and potentially during subsequent remedial system operation evaluations.
4. Collection of static water elevation data from appropriate wells/piezometers, as approved by U.S. EPA in consultation with the MDNR; and
5. A description and application of any modelling that will be utilized to determine location selection criteria, construction, and installation of the purge/pump test well(s); the reinjection system and the monitoring wells/piezometers which will be used to conduct and gather pump test data and dispose of purged waters and to demonstrate that reinjection of water produced during the pump test will not cause further degradation of known groundwater conditions.

The construction of (including any materials used during the installation and completion) any monitoring well or piezometer shall be subject to the approval of the U.S. EPA in consultation with the MDNR. The draft Pre-design Work Plan shall include all necessary plans and reports as summarized below and shall be incorporated in as part of the RD/RA Work Plan. The Pre-design Work Plan shall be submitted to the U.S. EPA and the State in accordance with the schedule set forth in Task V, below.

B. Additional Studies

The Work Plan shall include a schedule and a description of any additional studies that will be necessary to initiate and complete the RD/RA. These additional studies may include, but are not limited to, the installation of additional monitoring wells, further geophysical work, pump tests, vacuum extraction, pilot tests, soil gas study, etc. At the direction of the U.S. EPA, in consultation with the State, for any such studies/work required, the Performing Settling Defendants shall furnish all services, plant, labor, equipment, investigations, studies, and superintendence. Any additional work shall be incorporated into the appropriate work and project plans (QAPP, H&S, Sampling, etc.) along with the schedule for the implementation of the additional work, and shall be subject to approval by U.S. EPA in consultation with MDNR.

C. Sampling and Analysis Plan

The Work Plan shall include a Sampling and Analysis Plan that shall address all sampling required pursuant to the Consent Decree, the First Amendment and the Second Amendment and this SOW, including but not limited to sampling of upper and lower aquifer groundwater, surface water, air, landfill gas and soil/sediment. The Sampling and Analysis Plan shall include, without limitation, identification and description of the contamination plume, compliance points, the quantity and timing of sampling at compliance points for testing the effectiveness of the remedial actions, and procedures for determining background concentrations of hazardous substances, pollutants, and contaminants.

D. Quality Assurance Project Plan (QAPP)

The Work Plan shall include a QAPP which shall establish quality control procedures to assure the precision and accuracy of all data gathered pursuant to the Consent Decree, the First Amendment, the Second Amendment and this SOW. The QAPP shall be consistent with the requirements of the U.S. EPA Contract Lab Program (CLP). At a minimum, the QAPP shall include the following:

- i. Statement of Purpose
- ii. Project Description
- iii. Project Organization and Responsibility
- iv. Sampling Procedures and Objectives
- v. Sample Custody and Document Control
- vi. Calibration Procedures and Frequency
- vii. Analytical Procedures, Data Reduction, Validation, Assessment, and Reporting
- viii. Internal Quality Control Checks and Frequency
- ix. Performance System Checks and Frequency
- x. Preventive Maintenance Procedures and Frequency
- xi. Data Precision, Accuracy and Completeness Assessment Procedures
- xii. Corrective Action
- xiii. Quality Assurance Reporting

E. Plan for Satisfaction of Permitting Requirements

The Work Plan shall include a plan for the satisfaction of requirements for all permits needed to design and implement the RD/RA. In the case of permits not being required because the Work is being conducted entirely on-site the substantive requirements of the permit(s) which would otherwise be required and consistent with ARARs, shall be detailed in this Plan.

F. Project Schedule

The Work Plan shall contain a plan describing the overall project schedule, identifying timing for all tasks, including any additional studies that may be needed, construction and implementation of the final remedial actions and any major interim milestones. The project schedule shall be consistent with and designed to achieve the deadlines contained in the compliance schedule set forth in this SOW. The project schedule shall be revised as necessary, with changes listed in the monthly reports and subject to approval by the U.S. EPA, in consultation with the State.

Task II: REMEDIAL DESIGN PROJECT PLANS

The Performing Settling Defendants shall prepare and submit to the U.S. EPA and the State, in accordance with the schedule set forth in Task V below, the following project plans prior to the implementation of the Remedial Actions at the facility as defined in the Purpose, and the Description of the Remedial Action of this SOW, the ROD, ROD Amendments, the Consent Decree, the First Amendment, the Second Amendment and in the RD/RA Work Plan: (The number of copies of each submittal as required by this SOW and Consent Decree, the First Amendment, the Second Amendment and the recipients thereof, shall be specified in the Work Plan.)

A. Design and Specifications Plan

The Performing Settling Defendants shall develop clear and comprehensive design and specification plans which shall include, but are not limited to, the following:

1. Discussion of the design strategy and the design basis, including;
 - a. Compliance with all applicable and all relevant and appropriate environmental and public health standards; and
 - b. Minimization of environmental and public impacts.
2. Discussion of the technical factors of importance including:
 - a. Use of currently accepted environmental control measures, design, and technology;
 - b. The constructability of the design; and
 - c. Use of currently acceptable construction practices and techniques.
3. Description of assumptions made and detailed justification of these assumptions;

4. Discussion of the possible sources of error and references to possible operation and maintenance problems;
5. Detailed drawings of the proposed design including;
 - a. Qualitative flow sheets; and
 - b. Quantitative flow sheets.
6. Tables listing equipment and specifications;
7. Tables giving material and energy balances, where appropriate;
8. Appendices including;
 - a. Sample calculations (one example presented and explained clearly for significant or unique design calculations);
 - b. Derivation of equations essential to understanding the report; and
 - c. Results of laboratory or field tests.

The Design and Specifications Plan shall be submitted to the U.S. EPA and the State in phases as described in paragraph F below.

B. Operation and Maintenance Plan

The Performing Settling Defendants shall prepare and submit to the U.S. EPA and the State, an Operation and Maintenance Plan to cover both implementation and long term maintenance of the Remedial Actions. The plan shall be composed of, but not necessarily limited to, the following elements:

1. Description of normal operation and maintenance (O&M);
 - a. Description of tasks for operation;
 - b. Description of tasks for maintenance;
 - c. Description of prescribed treatment or operation conditions; and
 - d. Schedule showing frequency of each O&M task.
2. Description of potential operating problems;
 - a. Description and analysis of potential operation problems;

- b. Sources of information regarding problems;
 - c. Common and/or anticipated remedies; and,
 - d. Useful life analysis of significant components and replacement costs
3. Quality Assurance Project Plan for O&M:
- a. Description of routine monitoring tasks;
 - b. Description of required laboratory tests and their interpretation;
 - c. Required data collection;
 - d. Identification and rationale of the location of monitoring points (groundwater, surface water and air) comprising the points of compliance monitoring;
 - e. Schedule of monitoring frequency and date, if appropriate, when monitoring may cease; and,
 - f. Description of triggering mechanisms for groundwater monitoring results, (i.e., detailing when the extraction system can be shut off and when it needs to be restarted).
4. Description of alternate O&M;
- a. Should systems fail, alternate procedures to prevent releases or threatened releases of hazardous substances, pollutants, or contaminants which may threaten public health, welfare or the environment or cause an exceedence of any cleanup standard established pursuant to the Consent Decree, the First Amendment and the Second Amendment; and,
 - b. Analysis of vulnerability and additional resource requirement should a failure occur.
5. Corrective Action;
- a. Description of corrective action to be implemented in the event that cleanup standards for groundwater, surface water discharges and air emissions are exceeded; and,

- b. Schedule for implementing these corrective actions;
- 6. Safety Plan For O&M;
 - a. Description of precautions, of necessary equipment, etc., for site personnel;
 - b. Safety tasks required in event of systems failure; and,
 - c. Safety tasks necessary to address protection of nearby residents during design and construction.
- 7. Description of equipment;
 - a. Equipment identification;
 - b. Installation of monitoring components;
 - c. Maintenance of site equipment; and
 - d. Replacement schedule for equipment and installed components.
- 8. Records and reporting mechanisms required.
 - a. Daily operating logs;
 - b. Laboratory records;
 - c. Records for operating costs;
 - d. Mechanism for reporting emergencies;
 - e. Personnel and maintenance records; and,
 - f. Reports to Federal and State agencies.

An initial Draft Operation and Maintenance Plan shall be submitted simultaneously with the Prefinal Design Document submission, described in Task II.F, below, and the Final Operation and Maintenance Plan with the Final Design Documents.

C. Cost Estimate

The Performing Settling Defendants shall develop and submit to the U.S. EPA and the State, cost estimates for the purpose of assuring that the Performing Settling

Defendants have the financial resources necessary to construct and implement the Remedial Action. The cost estimate developed in the FS shall be refined to reflect the more detailed/accurate design plans and specifications being developed. The cost estimate shall include both capital and operation and maintenance costs. An Initial Cost Estimate shall be submitted simultaneously with the Prefinal Design submission and the Final Cost Estimate with the Final Design Document.

D. Construction Quality Assurance Objectives Plan

The Performing Settling Defendants shall identify and document the objectives and framework for the development of a construction quality assurance program including, but not limited to the following: responsibility and authority; personnel qualifications; inspection activities; sampling requirements; and documentation.

E. Health and Safety Plan

The Performing Settling Defendants shall modify the Health and Safety (H&S) Plan developed for the RI/FS to address the activities to be performed at the facility to implement the Remedial Design and Remedial Action phases. The modified H&S Plan shall be submitted to U.S. EPA and the State simultaneously with an initial draft of the Prefinal Design submission and the Final H&S Plan be submitted with the Final Design Document. The H&S Plan shall comply with all U.S. EPA guidance and all OSHA requirements, including but not limited to 29 CFR 1910.

F. Design Phases

The design of the Remedial Actions shall include, but not be limited to, the phases outlined below.

1. Preliminary design:

The Performing Settling Defendants shall submit to U.S. EPA and the MDNR the Preliminary design when the design effort is approximately 30% complete. At this stage, the Performing Settling Defendants shall have field verified the existing conditions of the facility. The preliminary design shall reflect a level of effort such that the technical requirements of the project have been addressed and outlined so that they may be reviewed to determine if the final design shall provide an operable and usable Remedial Action. Supporting data and documentation shall be provided with the design documents defining the functional aspects of the program. The preliminary construction drawings by the Performing Settling Defendants shall reflect organization and clarity. The scope of the technical specifications shall be outlined in a manner reflecting the final specifications. The Performing Settling Defendants shall include with their preliminary submission, design calculations, where applicable, reflecting the

same percentage of completion as the designs they support.

2. Intermediate design:

At the discretion of the U.S. EPA, in consultation with MDNR, a design review may be required at 60% completion of the project. The intermediate design submittal shall include the same elements as the prefinal design.

3. Correlating plans and specifications:

General correlation between drawings and technical specifications, is a basic requirement of any set of working construction plans and specifications. Before submitting the project specifications, the Performing Settling Defendants shall:

- a. Coordinate and cross-check the specifications and drawings; and,
- b. Complete the proofing of the edited specifications and required cross-checking of all drawings and specifications.

These activities shall be completed prior to the 95% prefinal submittal to the Agency.

4. Equipment start-up and operator training:

The Performing Settling Defendants shall prepare, and include in the technical specifications governing treatment systems, contractor requirements for providing: appropriate service visits by experienced personnel to supervise the installation, adjustment, startup and operation of the treatment systems, and training covering appropriate operational procedures once the startup has been successfully accomplished. These activities shall be completed prior to the 95% prefinal submittal to the U.S. EPA.

5. Additional studies:

The design and/or implementation of the Remedial Actions may require additional studies to supplement the available technical data. At the direction of the Agency, for any such studies required, the Performing Settling Defendants shall furnish all services, including field work as required, materials, supplies, plant, labor, equipment, investigations, studies and superintendence. Sufficient sampling, testing and analysis shall be performed to optimize the required treatment and/or disposal operations and systems. There shall be an initial meeting of all principal personnel involved in the development of the program for any additional studies. The purpose will be to discuss objectives, resources, communication channels, roles of personnel involved and orientation of the

Facility, etc. Performing Settling Defendants shall submit to U.S. EPA and the State an interim report which shall present the results of all testing performed as part of any additional studies, together with a description of recommended treatment or disposal systems (including options). A review conference shall be scheduled after the interim report has been reviewed by all interested parties. The final report of the testing performed as part of any required additional study shall include all data taken during the testing and a summary of the results of the studies. The QAPP, Health and Safety Plan and Sampling and Analysis Plan previously submitted shall be modified to reflect any changes to the Work required as a result of such additional studies.

6. Prefinal and Final Design:

The Performing Settling Defendants shall submit the Prefinal/Final design documents in two parts to the U.S. EPA and the MDNR. The first submission shall be at 95% completion of design (i.e., prefinal). After approval of the prefinal submission, the Performing Settling Defendants shall execute any required revisions and submit the final documents 100% complete with reproducible drawings and specifications.

The Prefinal Design submittal shall include, but not be limited to, the Design and Specifications Plan, Operation and Maintenance Plan, Operating and Maintenance Plan, Cost Estimate, Construction Quality Assurance Objectives Plan, QAPP and the Health and Safety Plan.

The Final Design submittal shall include, but not be limited to, the Final Design and Specifications Plan (100% complete), the Performing Settling Defendants' Final Construction Cost Estimate, the Final Operation and Maintenance Plan, Final Construction Quality Assurance Objectives Plan, Final QAPP, Final Project Schedule and Final Health and Safety Plan specifications. The quality of the design documents shall be such that the Performing Settling Defendants shall be able to include them in a bid package and invite contractors to submit bids for the construction project.

G. Community Relations Support

A community relations program shall be implemented jointly by the U.S. EPA and the State. The Performing Settling Defendants shall cooperate with the U.S. EPA and the State, participate in the preparation of all appropriate information disseminated to the public, and in public meetings that may be held or sponsored by the U.S. EPA or the State to explain activities at or concerning, the Facility. Community relations support shall be consistent with Superfund community relations policy as stated in the "Guidance for Implementing the Superfund Program" and "Community Relations in Superfund - A Handbook".

TASK III: REMEDIAL ACTION CONSTRUCTION

Within 60 days of U.S. EPA approval of the final design or within 60 days after the Second Amendment is entered, whichever time is later, the Performing Settling Defendants shall develop and implement a construction quality assurance (CQA) program to ensure, with a reasonable degree of certainty, that the Remedial Action, upon completion, will meet or exceed all design criteria, plans and specifications. The CQA plan is a facility-specific document which must be submitted to the Agency for approval prior to the start of the construction. At a minimum, the CQA plan shall include the elements, which are summarized below. Upon EPA approval of the CQA Plan, the Performing Settling Defendants shall construct and implement the Remedial Actions in accordance with the approved design, schedule and the CQA plan. The Performing Settling Defendants shall also implement the elements of the approved operation and maintenance plan.

A. Responsibility and Authority

The responsibility and authority of all organizations (i.e. technical consultants, construction firms, etc.) and key personnel involved in the construction of the Remedial Action shall be described fully in the CQA plan. The Performing Settling Defendants shall also identify a CQA officer and the necessary supporting inspection staff.

B. Construction Quality Assurance Personnel Qualifications

The qualifications of the CQA officer and supporting inspection personnel shall be presented in the CQA plan to demonstrate that they possess the training and experience necessary to fulfill their identified responsibilities.

C. Inspection Activities

The observations and tests that shall be used to monitor the construction and/or installation of the components of the Remedial Actions shall be summarized in the CQA plan. The plan shall include the scope and frequency of each type of inspection. Inspections shall verify compliance with the environmental requirements and include, but not be limited to air quality and emissions monitoring records, waste disposal records (e.g., RCRA transportation manifests), etc. Inspections shall also ensure compliance with all health and safety procedures. In addition to oversight inspections, the Performing Settling Defendants shall conduct the following activities:

1. Preconstruction inspection and meeting:

The Performing Settling Defendants shall participate with the U.S. EPA and the

State in a preconstruction inspection and meeting to:

- a. Review methods for documenting and reporting inspection data;
- b. Review methods for distributing and storing documents and reports;
- c. Review work area security and safety protocol;
- d. Discuss any appropriate modifications of the construction quality assurance plan to ensure that site-specific considerations are addressed; and,
- e. Conduct a site walk-around to verify that the design criteria, plans, and specifications are understood and to review material and equipment storage locations.

The preconstruction inspection and meeting shall be documented by a designated person and minutes shall be transmitted to all parties.

2. Prefinal inspection:

Upon preliminary project completion, the Performing Settling Defendants shall notify the U.S. EPA and the State for the purposes of conducting a prefinal inspection. The prefinal inspection shall consist of a walk-through inspection of the entire Facility. The inspection is to determine whether the project is complete and consistent with the contract documents and the U.S. EPA approved Remedial Action. Any outstanding construction items discovered during the inspection shall be identified and noted. Additionally, treatment equipment shall be operationally tested by the Performing Settling Defendants. The Performing Settling Defendants shall certify that the equipment has performed to meet the purpose and intent of the specifications. Retesting shall be completed where deficiencies are revealed. The prefinal inspection report shall outline the outstanding construction items, actions required to resolve items, completion date for these items, and a proposed date for final inspection.

3. Final inspection:

Upon completion of any outstanding construction items, the Performing Settling Defendants shall notify the U.S. EPA and the State for the purposes of conducting a final inspection. The final inspection shall consist of a walk-through inspection of the Facility by U.S. EPA and the Performing Settling Defendants. The prefinal inspection report shall be used as a checklist with the final inspection focusing on the outstanding construction items identified in the prefinal inspection. Confirmation shall be made that outstanding items have

been resolved.

D. Sampling Requirements

The sampling activities, sample size, sample locations, frequency of testing, acceptance and rejection criteria, and plans for correcting problems in achieving the project specifications shall be presented in the CQA plan and carried out according to the Sampling Plan.

E. Documentation

Reporting requirements for CQA activities shall be described in detail in the CQA plan. This shall include such items as daily summary reports, inspection data sheets, problem identification and corrective measures reports, design acceptance reports, and final documentation. Provisions for the final storage of all records shall be presented in the CQA plan.

TASK IV: Reports

The Performing Settling Defendants shall prepare and submit to U.S. EPA and the State, plans, specifications, documents, and reports as set forth in Tasks I through Task V to document any additional studies, and the design, construction, operation, maintenance, and monitoring of the Remedial Action. Reports shall be signed by the Performing Settling Defendants' Project Coordinator and shall include the following statement: "I certify that the information contained in or accompanying this (submission) (document) is true, accurate and complete". The documentation shall include, but not be limited to the following:

A. Progress Reports

The Performing Settling Defendants shall at a minimum provide the EPA and the State with monthly progress reports until such time that the U.S. EPA approves the Certification of Completion of Construction Report and then thereafter shall submit to the U.S. EPA and the State semi-annual progress reports for operation and maintenance activities. These reports shall contain, at a minimum, the following:

1. A description and estimate of the percentage of the RD/RA completed;
2. All findings and results of sampling during the reporting period;
3. Summaries of all changes made in the RD/RA during the reporting period, indicating U.S. EPA/State approval of those changes;

4. Summaries of all contacts with representatives of the local community, public interest groups and/or State government during the reporting period;
5. Summaries of all problems or potential problems encountered during the reporting period;
6. Actions being taken to rectify problems;
7. Changes in personnel during the reporting period;
8. Projected work for the next reporting period; and,
9. Copies of daily reports, inspection reports, laboratory/monitoring data, etc.

B. Draft Plans and Reports to be submitted to U.S. EPA and MDNR

1. The Performing Settling Defendants shall submit a draft Pre-design Work Plan and a RD/RA Work Plan as outlined in Task I;
2. The Performing Settling Defendants shall submit a draft Design and Specifications Plan, Cost Estimates, Operation and Maintenance Plan, Construction Quality Assurance Objectives Plan, Health and Safety Plan, and Study Reports as outlined in Task II;
3. The Performing Settling Defendants shall submit a draft construction Quality Assurance Program Plan and Documentation as outlined in Task III; and,
4. Within 30 days of completion of Task III.C.3 of the SOW, the Performing Settling Defendants shall submit a draft Completion of Construction Report to the U.S. EPA and the State. The Report shall document that the project is consistent with the design specifications, and that Remedial Action is performing adequately. The Report shall include, but not be limited to the following elements:
 - a. Synopsis of the Remedial Action and certification of the design and construction;
 - b. Explanation of any modifications to the plans and why these were necessary for the project;
 - c. Listing of the criteria, established before the Remedial Action was initiated, for judging the functioning of the Remedial Action and also explaining any modification to these criteria;

- d. Results of facility monitoring, indicating that the Remedial Action shall meet or exceed the performance and cleanup standard criteria;
 - e. Actions taken as a result of the Prefinal Inspection; and,
 - f. Explanation of the operation and maintenance (including monitoring) to be undertaken at the facility.
5. When the Performing Settling Defendants deem that they have achieved cleanup and performance standards, pursuant to the Consent Decree, the First Amendment and the Second Amendment, they shall submit a draft Remedial Action Report to the U.S. EPA and the State. The Report shall document that the project is consistent with the design specifications, and that the Remedial Action was performed adequately and the goals have been met. The Report shall include, but not be limited to the following elements:
- a. Synopsis of the Remedial Action and certification of the design and construction;
 - b. Explanation of any modifications to the plans and why these were necessary for the project;
 - c. Listing of the cleanup and performance standards as established in the Consent Decree, the First Amendment and the Second Amendment, and also explaining any modifications to these cleanup and performance standards;
 - d. Results of Facility monitoring, indicating that the Remedial Action has met or exceeded the cleanup and performance criteria; and,
 - e. Explanation of the operation and maintenance (including monitoring) to be undertaken at the Facility as outlined in Task II.B.

C. Final Plans and Reports

The Performing Settling Defendants shall finalize the Pre-design Work Plan, RD/RA Work Plan, Design and Specifications Plan, Cost Estimates Plan, Operation and Maintenance Plan, Health and Safety Plan, Study Reports, Construction Quality Assurance Program Plan/Documentation, Completion of Construction Report, and Remedial Action Report incorporating comments received on draft submissions.

Following the approval of the Final Completion of Construction Report, the U.S. EPA will issue a Certification of Completion of Remedial Construction to the Performing Settling Defendants.

TASK V: Schedule for RD/RA Implementation

A summary of reporting requirements contained in the RD/RA Scope of Work is presented below:

<u>Submission</u>	<u>Due Date</u>
1. Draft Pre-design Work Plan (Task I, A-E)	Thirty (30) days after lodging of the Consent Decree
2. U.S. EPA Comment of Draft	***
3. Final Pre-design Work Plan	Thirty (30) days after U.S. EPA comment on the draft Pre-design Work Plan
4. Implementation of Pre-design	Thirty (30) days after U.S. EPA approval of Final Pre-design Work Plan
5. Draft Pre-design Report	Thirty (30) days after completion of Pre- design work
6. U.S. EPA Comment on Draft	***
7. Final Pre-Design Report	Thirty (30) days after U.S. EPA comment on the draft Pre-design Report
8. a. Draft Work Plan for Municipal Water Supply	Thirty (30) days after lodging the Second Amendment
b. Final Work Plan for Municipal Water Supply	Thirty (30) days after U.S. EPA comment on the draft
c. Implement the Municipal Water Supply Final Work Plan	Thirty (30) days after U.S. EPA approval of the Final Work Plan

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| d. Draft Municipal Water Supply Report | Thirty (30) days after completing the Municipal Water Supply Work Plan work. |
| e. Final Municipal Water Supply Report | Thirty (30) days after U.S. EPA comment on the draft Municipal Water Supply Work Plan work. |
| 9. Draft MNA Work Plan | Sixty (60) days after the lodging of the Second Amendment. |
| 10. Draft RD/RA Work Plan | Thirty (30) days Task I, A-E) after the U.S EPA approval of the Final Pre-design Report |
| 11. U.S. EPA Comment on Draft | *** |
| 12. Final RD/RA Work Plan (Task I) | Thirty (30) days after U.S. EPA comment on the Draft Work Plans |
| 13. U.S. EPA Approval of Final Work Plan | *** |
| 14. Remedial Design Project Plans (Task II A,F) | |
| a. Preliminary Design (30% completion) | Seventy-five (75) days after U.S. EPA approval of Final Work Plan |
| b. U.S. EPA Approval of Preliminary Design | *** |
| c. Intermediate Design (60% completion) | Sixty (60) days after U.S. EPA approval of Preliminary Design. Intermediate Design may not be required. |
| d. U.S. EPA Approval of Intermediate Design, if required | *** |
| e. Prefinal Design (95% completion) | Sixty (60) days after U.S. EPA approval of the Intermediate Design |

(if Intermediate Design is called for), or 120 days after approval of the Preliminary Design in the event the Intermediate Design is not required, as determined by the U.S. EPA.

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| f. U.S. EPA Approval of Prefinal Design | *** |
| g. Final Design (100% completion) | Thirty (30) days after U.S. EPA approval of Prefinal Design |
| (Task II B through E) | |
| a. Draft Submittals | Concurrent with Prefinal Design |
| b. Final Submittals | Concurrent with Final Design |
| 15. Draft Construction Quality Assurance Plan (CQAP) | Sixty (60) days after submittal of and U.S. EPA approval of Final Design (Task II) or Sixty (60) days after the Second Amendment is entered, which ever is later. |
| 16. U.S. EPA Comment on Draft CQAP | *** |
| 17. Final Construction Quality Assurance | Thirty (30) days an (Task III) after U.S. EPA comment on Draft CQAP |
| 18. U.S. EPA Approval of Final CQAP | *** |
| 19. Pre-Construction Inspection Report | As approved in the Final CQAP |
| 20. Construction of Remedial Actions | As approved in the Final CQAP |
| 21. U.S. EPA Prefinal Inspection | *** |
| 22. Prefinal Inspection Report | Thirty (30) days after U.S. EPA's Prefinal Inspection |
| 23. Draft Completion of Construction Report (Task IV) | Thirty (30) days after completion of Task III.C.3. of the SOW regarding final inspection. |

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| 24. U.S. EPA Comment on the Draft Completion of Construction Report | *** |
| 25. Final Completion of Construction | Thirty (30) days Report after U.S. EPA comment on Draft Completion of Construction Report |
| 26. Draft Remedial Action Report (Task IV) | After achievement of cleanup and performance standards |
| 27. U.S. EPA Comment on Draft Remedial Action Report | *** |
| 28. Final Remedial Action Report | Thirty (30) days after U.S. EPA comment on the draft Remedial Action Report |
| 29. Progress Reports prior to U.S. EPA's Approval of the Certification of the Completion of Construction | Monthly |
| 30. Progress Reports after U.S. EPA Approval of the Certification of Completion of Construction | Semi-annual |
| 31. Status Report (per Paragraph 31 of the Consent Decree) | Annually |
| 32. Draft Application for Groundwater Use Restrictions | Forty-five (45) days after lodging of Second Consent Decree Amendment |

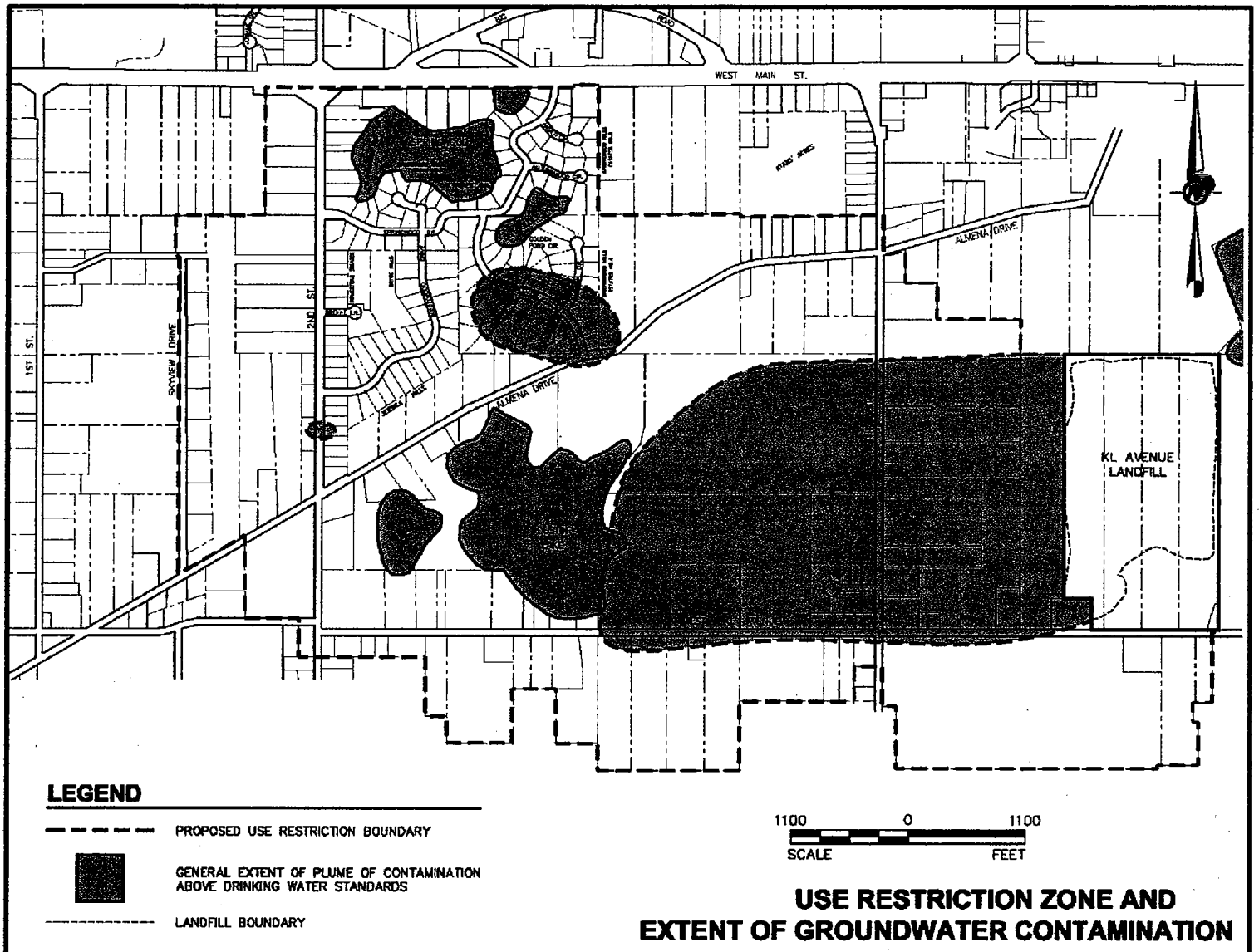


Figure 1